REMARKS

In the parent application Ser. No. 09/820,079 filed March 28, 2001, an Advisory Action dated April 21, 2003, objected to claims 1-14 and 16-20 for being unpatentable over Wang in view of Ahn. The present continuation application has been filed to further prosecute claims 1, 3-10, 12-14 and 16-20, claims 2 and 11 having been cancelled, without prejudice. Thus, the instant Preliminary Amendment will address the rejections from the parent application's Final Office Action.

Claim 1 and 9 have been amended to include the limitation that the diffusion barrier layer has a thickness in a range from about one atomic monolayer to about 1000 angstroms, and claim 16 has been amended to include the limitation that the first dielectric layer has a thickness in a range from about one atomic monolayer to about 1000 angstroms. Support for these amendments is found in the Detailed Description section of the current application, page 14, lines 3-4. No new matter has been added with this amendment.

No new subject matter has been added with this amendment. Claims 2 and 11 have been cancelled without prejudice. No claims have been added. Thus, claims 1, 3-10, 12-14 and 16-20 remain pending.

A.. 35 U.S.C. § 103(a)

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Wang in view of Ahn - Claims 1, 3-8

Claims 1 and 3-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the U.S. Patent No. 6,291,887 issued September 18, 2001 to Fei Wang et al., (hereinafter "the Wang patent") (Final Office Action, dated January 22, 2003, page 2) in view of the U.S. patent publication No. US 2002/0090806 A1 published July 11, 2002 to Ahn et al (hereinafter the "Ahn reference"). For at least the reasons set forth below, Applicants submit that the claims 1 and 3-8 are not rendered obvious by the Wang patent.

As previously stated, claim 1 of the present invention has been amended to include the limitation that the diffusion barrier layer has a thickness in a range from about one atomic monolayer to about 1000 angstroms. With regard to claim 1, the Office relies on the Wang patent (col. 12, lines 20-32) for a teaching of a "first low k dielectric layer (diffusion barrier layer) and a nitride layer (etch stop) deposited on top, covered by another dielectric layer" (Office Action, page 2). The Wang patent does not disclose a thickness for the diffusion barrier in the range of one atomic monolayer to about 1000 angstroms, as described in the amended claim 1 of the present invention. The first dielectric layer of the Wang patent is provided to electrically isolate

the stud 30 from other patterned conductive material layers located on the semiconductor device (see FIG. 11). Such isolation structures are typically at least 5,000 angstroms, in order to maximize their effectiveness as electrical isolation structures, as is well known to those skilled in the art.

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." In *re Royka*, 490 F.2d 981,180 USPQ 580 (CCPA 1974). Because the Wang patent does not teach or suggest a diffusion barrier layer which is in the range of one atomic monolayer to about 1000 angstroms, as taught in claim 1 of the present invention, claim 1 is not rendered obvious by the Wang patent.

Regarding claims 3 and 4, the Office relies on Wang for a teaching of the first dielectric layer being a polymer and the etch stop layer being a nitride. However, as described above, there is no motivation to modify the dielectric layer of Wang to be 1,000 Angstroms or less, as is taught in the present invention, and since all of the claim limitations must be taught or suggested by the prior art, claims 3 and 4 are not rendered obvious by the Wang patent.

Regarding claims 5 and 6, the Office admits that Wang does not disclose an inorganic/organic stacking sequence (Office Action, page 3), but that Ahn does disclose such a stack, as in the present invention. However, as described above, there is no motivation to modify the dielectric layer of either Wang or Ahn to be 1,000 Angstroms or less. Since the Ahn reference cannot be relied upon, claims 5 and 6 are not rendered obvious by the Wang patent.

Regarding claims 7 and 8, the Office contends that although Wang does not disclose a contact trace disposed within the substrate (Office Action, page 4), as is taught in the present invention, Ahn disloses such a structure. However, since neither Wang nor Ahn disclose a

dielectric layer which is 1,000 Angstroms or less in thickness, claims 5 and 6 are not rendered obvious by the Wang patent.

If an independent claim is nonobvious, then any claim depending from the independent claim is also nonobvious. *In re Fine*, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1998). Because dependent claims 3-8 depend from claim 1, Applicant submits that claims 3-8 are not rendered obvious by the Wang patent. Therefore, reconsideration and withdrawal of the Section 103(a) rejection of claims 1-8 are respectfully requested.

Ahn in view of Wang – Claims 9-10, 12-14 and 16-20

Claims 9-10, 12-14 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahn in view of Wang. With regard to claims 9 and 10, the Office contends that although the Ahn patent does not disclose an ILD layer overlying the etch stop, Wang discloses such a structure (Office Action, page 4). Claim 9 has been amended to include a diffusion barrier layer comprising a thickness in a range of 20 angstroms to about 1,000 angstroms. However, because neither the Wang patent nor the Ahn patent teach or suggest a barrier layer of about 1,000 angstroms or less, claim 9 and claim 10 (which depends from claim 9) are not rendered obvious under the Wang patent.

With regard to claims 12-14, the Office does not rely on either Wang or Ahn for a teaching of a stacked structure in which the effective dielectric constant is in the range of 2.6 to 2.8, as is disclosed in claims 12-14, but contends that it would be inherently obvious that an effective dielectric constant within the aforementioned range could be obtained. However, because neither the Wang patent nor the Ahn patent teach or suggest a barrier layer of about 1,000 angstroms or less, claims 12-14 are not rendered obvious under the Wang patent.

If an independent claim is nonobvious, then any claim depending from the independent claim is also nonobvious. *In re Fine*, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1998). Because dependent claims 10 and 12-14 depend from claim 9, Applicants submit that claims 10 and 12-14 are not rendered obvious by the Wang patent. Therefore, reconsideration and withdrawal of the Section 103(a) rejection of claims 9-10 and 12-14 are respectfully requested.

With regard to claims 16-18, the Office contends that the Wang patent does not disclose an inorganic/organic stacking sequence from the substrate, and relies on Ahn for such a disclosure. Claim 16 has been amended to include a first dielectric layer comprising a thickness in a range of 20 angstroms to about 1,000 angstroms. Because neither the Wang patent nor the Ahn patent teach or suggest a first dielectric layer of about 20 angstroms to about 1,000 angstroms, claim 16 and claims 17-18 (which depend from claim 16) are not rendered obvious under the Wang patent. Therefore, reconsideration and withdrawal of the Section 103(a) rejection of claims 16-18 are respectfully requested.

With regard to claims 19-20, the Office contends that it would be trivial to select materials from the range of materials disclosed in Ahn that exhibit dielectric constants in the range of 2.0 to 2.8. However, because neither the Wang patent nor the Ahn patent teach or suggest a barrier layer of about 1,000 angstroms or less, claims 19-20 are not rendered obvious under the Wang patent. Therefore, reconsideration and withdrawal of the Section 103(a) rejection of claims 19-20 are respectfully requested.

In view of the foregoing remarks, the Applicants request allowance of the application. Please forward further communications to the address of record. If the Examiner needs to contact the below-signed agent to further the prosecution of the application, the contact number is (503) 264-0944.

Respectfully submitted,

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VERSION OF CLAIMS WITH MARKINGS

IN THE CLAIMS:

1. In a microelectronic device, a structure on a substrate comprising:

a diffusion barrier layer disposed above and on the substrate, the diffusion barrier layer having a first thickness and a first dielectric constant, wherein the first thickness comprises a a range from about one atomic monolayer to about 1000 angstroms;

an etch stop layer above and on the diffusion barrier layer, the etch stop layer having a second thickness and a second dielectric constant; and

an interlayer dielectric (ILD) layer disposed above and on the etch stop layer, wherein the structure has an effective dielectric constant in the range less than about 3.

9. In a microelectronic device, a structure comprising:

a substrate having an upper surface;

an electrically conductive trace in the substrate;

a diffusion barrier layer above and on the substrate and the trace, wherein the diffusion barrier layer comprises a thickness in a range from about one atomic monolayer to about 1000 angstroms;

an etch stop layer above and on the diffusion barrier layer; and

an ILD layer disposed above and on the etch stop layer, wherein the diffusion barrier layer and the etch stop layer are mutually exclusively selected from either an organic composition or an inorganic composition.

16. An article of manufacture comprising:

a semiconductor substrate;

a first dielectric layer disposed above and on the substrate, wherein the first dielectric layer comprises a thickness in a range from about one atomic monolayer to about 1000 angstroms;

a second dielectric layer disposed on the first dielectric layer;

an inter layer dielectric (ILD) layer disposed on the second layer; and

a conductive damascene article, wherein the conductive damascene article is in contact with the substrate, the first dielectric layer, the second dielectric layer, and the ILD layer; and

wherein the first dielectric layer is an inorganic composition, and wherein the second dielectric layer is an organic composition.